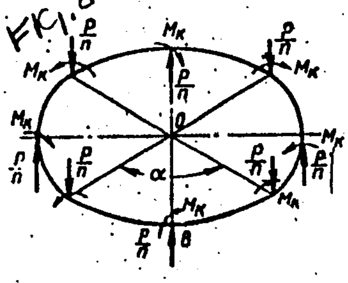
30373
S/572/61/000/007/004/006
D221/D302

Legend to Fig. 8: The diagram for calculating a connected ring.

FIG. 8



BIRGER, I.A., doktor tekhn.nauk, prof.

Determining the yield of intermediate parts of a threaded joint.
Vest. mash. 41 no. 5:41-44 My '61. (MIRA 14:5)
(Fastenings)

APPROVED FOR RELEASE: 06/08/2000 CIA-RDP86-00513R000205320015-3"

MALININ, Nikolay Nikolayevich; BIRGER, I.A., doktor tekhn. nauk, prof., retsenzent; PONOMAREV, S.D., doktor tekhn. nauk, prof., red.; BYSTRITSKAYA, V.V., red. izd-va; UVAROVA, A.F., tekhn. red.

[Strength of turbomachines]Prochnost' turbomashin. Moskva, Mashgiz, 1962. 291 p. (MIRA 15:10)

(Turbomachines)

BIRGER, I.A.

Methods of determining residual stresses in disks. Zav.lab. 28 no.7:859-864 '62. (MIRA 15:6)
(Strains and stresses) (Metals--Testing)

S/032/62/028/005/007/009
B117/B101

AUTHOR: Birger, I. A.

TITLE: Methods of determining residual stresses in bars and plates

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 5, 1962, 599-604

TEXT: Mechanical methods of determining residual stresses in samples during the removal of metal layers are discussed in detail. These methods have already been discussed by a number of other authors (N. N. Davidenkov, Ye. M. Shevandin, M. M. Saverin, M. A. Babichev, L. A. Glikman, D. I. Grekov) earlier. They consist in determining the surface tensions by measuring deformations appearing in the sample after removal of the metal layers. The deformations are assumed to be of a plastic nature. Equations for determining the residual stress in bars with rectangular or any cross section, as well as in plates are derived. The English-language reference reads as follows: R. Treuting, W. Read., J. of Appl. Phys., v. 22, no. 2, Febr. (1951).

Card 1/1

10.7100

S/032/62/028/007/009/011
B104/B102

AUTHOR: Birger, I. A.

TITLE: Methods of determining residual stresses in disks

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 7, 1962, 859 - 864

TEXT: Four methods are described and compared: (1) a drilling method in which the radial displacements and circular deformations are determined at the internal and external radii of the disk; (2) an 'annular' method, in which a ring is cut out of the disk, and the resulting changes in size are determined; (3) another 'annular' method whereby the changes in diameter are determined; (4) a 'cubic' method, in which strain gauges are affixed to the disk, and cubes are then cut out. Formulas are derived for calculating the residual stresses from the changes in shape of the disk as determined by the four methods. The first method requires strain gauges or a precise measuring microscope. Using either of the 'annular' methods the mutual displacements of the measuring points are greater. The 'cubic' method is very simple, but the stress pattern is difficult to obtain. There are 6 figures.

JB

Card 1/1

40670

S/032/62/028/009/004/009
B104/B102

10.6200,

AUTHOR: Birger, I. A.

TITLE: Determination of the residual stresses in thin-walled tubes

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 9, 1962, 1112 - 1117

TEXT: Formulas for determining residual stresses in thin-walled tubes by the ring and strip method are derived. With the ring method the residual stress in the ring zone (da) is made up as follows: $\sigma_\theta^*(a) = \sigma_\theta(a) + \sigma_{\theta 1}(a) + \sigma_{\theta 2}(a) + \sigma_{\theta 3}(a)$, where $\sigma_\theta^*(a)$ is the circular residual stress in the zone da (Fig. 1), $\sigma_\theta(a)$ is the original circular residual stress in the zone a and the other three terms represent the residual stresses produced by cutting off the ring, slitting it and chipping off thin layers. Using the strip method a small strip is cut out of the tube and the residual stress is determined from its deformation (Fig. 5). $\sigma_{z\pi} = \sigma_z + \sigma_{zB}$ holds for the residual stress in the strip where σ_z is the axial residual stress in the tube and σ_{zB} the additional stress in the strip due to cutting out.

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Expressions are worked out for all of the terms and are used to give

$$\sigma_\theta(a) = \frac{1}{1-\mu^2}[F_\theta(a) + \mu F_z(a)]; \qquad (27)$$

$$\sigma_z(a) = \frac{1}{1-\mu^2}[F_z(a) + \mu F_\theta(a)]. \qquad (28)$$

where

$$F_\theta(a) = 2\frac{E\delta_p}{D_{cp}^2}\left(\frac{h}{2}-a\right) - \frac{1}{3}\frac{E(h-a)^2}{D^2(a)}\times \frac{d\delta}{da} + \frac{2E}{3}\int_0^a \frac{2h-3a+\xi}{D^2(\xi)}\frac{d\delta}{d\xi}d\xi. \quad (20)$$

and

$$F_z(a) = -\frac{8E}{l^2}f_0\left(\frac{h}{2}-a\right) + \frac{4E}{3l^2}\left[(h-a)^2\frac{df}{da}(a) - 4(h-a)f(a) + 2\int_0^a f(\xi)\,d\xi\right]. \quad (26).$$

The method by N. N. Davidenkov (Zhurnal tekhnicheskoy fiziki, v. 1, no. 1 (1931)) is improved by taking account of the stresses that occur in cutting out the strips, obtaining:

Determination of the residual...

$$\sigma_{\theta}(a) = \pm \left\{ 2 \frac{E \delta_{p}}{(1-\mu^{2}) D_{cp}^{2}} \left(\frac{h}{2} - a \right) - \right.$$

$$- \frac{1}{3} \frac{E (h-a)^{3}}{(1-\mu^{2}) D^{3}(a)} \frac{d\delta}{da} +$$

$$\left. + \frac{2E}{3(1-\mu^{2})} \int_{0}^{a} \frac{2h - 3a + \xi}{D^{3}(\xi)} \frac{d\delta}{d\xi} d\xi \right\}, \quad (35)$$

where δ_p is the increase of the tube diameter after the strip is cut out. There are 6 figures.

S/032/62/028/009/004/009
B104/B102

Determination of the residual...

Fig. 1

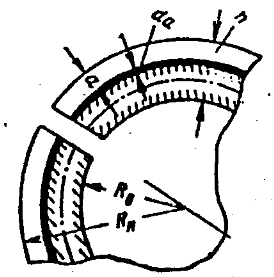
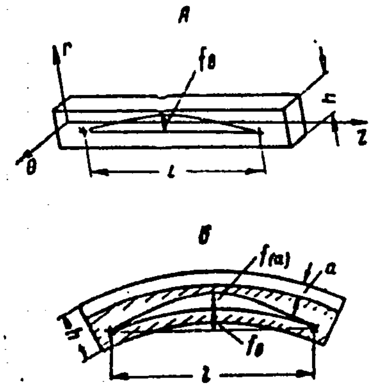


Fig. 5



Card 4/4

43092

S/032/62/028/012/011/023
B104/B186

10.8100

AUTHOR: Birger, I. A.

TITLE: Determination of residual stresses in hollow and in massive cylinders

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 12, 1962, 1482-1484

TEXT: Assuming the radial and tangential residual stresses in a thin disk, cut from a cylinder, to be the same as those in the cylinder; assuming also that the axial stress across the thickness is constant and that the residual stresses have axial symmetry, the theory of elasticity is used to arrive at the formulas

$$\sigma_\theta(r) = \sigma_\theta^*(r) + \mu\sigma_z(r) - \frac{\mu}{r^2}\int_{R_1}^{r} r\sigma_z\,dr \qquad (10),$$

$$\sigma_r(r) = \sigma_r^*(r) + \frac{\mu}{r^2}\int_{R_1}^{r} r\sigma_z\,dr \qquad (11)$$

for the radial and tangential stresses. $\sigma_\theta^*(r)$ and $\sigma_r^*(r)$ can be determined

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X

by known methods as described in a previous paper (I. A. Birger, Zavodskaya laboratoriya, 28, 7, 859 (1962)). Here a method of determining the axial residual stresses in a cylinder is described. Two symmetrical grooves are cut from a cylinder (Fig. 3) and the strain $\varepsilon_{\theta 2}(r)$ on the outer surface is then determined. Neglecting the edge effects on the bottom of the grooves and the radial strain the axial stress is

$$\sigma_z(r) = -\frac{E}{2\mu(1+\mu)r}\frac{dF(r)}{dr}, \qquad (15),$$

where $F(r) = \varepsilon_{\theta 2}(r)f(r)$ is a known function which is approximated parabolically. Using the formulas (10), (11) and (15) one can thus calculate the residual stresses in a cylinder from the strain that arises when thin disks and grooves are cut out. There are 3 figures.

BIRGER, I.A.; KOLOSOV, M.A., inzh., retsenzent; BYSTRITSKAYA, V.V., inzh., red.; DEMKINA, N.F., tekhn. red.

[Residual stresses] Ostatochnye napriazheniia. Moskva, Mashgiz, 1963. 231 p. (MIRA 16:11)
(Stains and stresses)

BIRGER, I.A. (Moskva)

Method of additional deformations in problems of the plasticity theory. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.1:47-56 Ja-F '63. (MIRA 16:2)

(Plasticity)
(Deformations (Mechanics))

AM4008928 BOOK EXPLOITATION S/

Birger, I. A.

Residual Stresses (Ostatochny*ye napryazheniya) Moscow, Mashgiz, 1963, 231 p. illus., biblio., 4,000 copies printed.

TOPIC TAGS: residual stress, rod, plate, thinwalled tube, turbine disc, cylinder, x ray determination, turbine blade, steel 18KhNVA, steel 18KhNMA, steel KhVG, alloy EI 437A, alloy EI 437

PURPOSE AND COVERAGE: This book discusses the formation of residual stresses in metals and their influence on strength in static and cyclic loading. Methods of determining and analyzing residual stresses in rods, plates, tubes, discs, cylinders, and the surface layers of parts of complex configuration are described. The book is intended for engineers, designers, and researchers working in the machine building specialties.

TABLE OF CONTENTS:

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BIRGER, I. A. (Moscow)

"The methods of elastic solutions in the problems of the theory of plasticity and creep"

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 1964.

ACCESSION NR: AP4018444 S/0179/64/000/001/0193/0196

AUTHOR: Birger, I. A. (Moscow)

TITLE: Theory of plastic flow with nonisothermal loading

SOURCE: AN SSSR. Izv. Otd. tekh. nauk. Mekhanika i mashinostroyeniye, no. 1, 1964, 193-196

TOPIC TAGS: nonisothermal loading, thermal deformation, elasticity, pliability, deformation, plastic deformation, plastic flow, elastic deformation, strain, stress

ABSTRACT: The law of plastic deformations with non-isothermal loading was studied by Prager (See Prager, V., Neizothermicheskoye deformirovaniye, Sb. "Mekhanika", No. 5 (57), IL, 1959), but practical use of this work is difficult. The present article is a generalization of the theory of plastic flow in the case of non-isothermal loading. Deformation curves are given. Orig. art. has: 6 figures, 18 formulas.

ASSOCIATION: none

SUBMITTED: 14Mar63 DATE ACQ: 23Mar64 ENCL: 00

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ACCESSION NR: AP4018444

SUB CODE: AP NO REF SOV: 003 OTHER: 001

Card 2/2

BIRGER, I.A. (Moskva)

Methods of elastic solutions in the theory of a plastic flow.
Izv. AN SSSR. Mekh. i mashinostr. no. 2:116-118 Mr-Ap '64.
(MIRA 17:5)

basic disk undergoes no deformation due to bending. Approximate methods are ...

BIRGER, I.A., doktor tekhn. nauk, prof.

Using Bayes' formula in problems of technical diagnostics. Vest. mashinostr. 44 no.10:24-25 O '64. (MIRA 17:11)

BIRGER, I.A., doktor tekhn. nauk, prof.

Strength calculation of rings. Rasch.na proch. no.10:31-64 '64.
(MIRA 18:1)

L 57012-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/EPR/T/EWP(t)/EEP(b)/EWP(k)/

AUTHOR: Birger, I. A. (Moscow)

L 57019-65

AT6001260 IJP(c) WW/EM

SOURCE CODE: UR/0000/65/000/000/0003/0035

AUTHOR: Birger, I. A.

ORG: none

34
33
B+1

TITLE: General case of deformation of shells of revolution

SOURCE: Prochnost' i dinamika aviatsionnykh dvigateley (Durability and dynamics of aircraft engines); sbornik statey, no. 2, Moscow, Izd-vo "Mashinostroyeniye," 1965, 3-35

TOPIC TAGS: shell of revolution, cylindrical shell, shell deformation, variable thickness shell

ABSTRACT: Strains in shells of revolution of variable thickness are discussed, assuming the validity of the hypothesis of preservation of normals. The shells are exposed to an arbitrary system of external loads and additional (e.g. thermal) stresses. A system of integral equations for determining strains in shells of revolution is derived which contains unknown functions accounting for the effects of the basic and supplementary loading, temperature, and boundary conditions. This system can be solved without differentiating the geometric parameters of the shell so that the method of successive approximations can be used here in its most expedient form. A particular problem of determining the strains in a cylindrical shell is solved as an example and the details of the proposed method are explained. Expressions for the above-mentioned unknown functions of loading and boundary conditions

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UDC: 621.43-215:539.37

ACC NR: AT6001260

are derived, and from them formulas are deduced for determining these functions in a case of axisymmetric deformation of a cylindrical shell. Orig. art. has: 9 figures and 177 formulas. [VK]

SUB CODE: 20/ SUBM DATE: 17Jul65/ ORIG REF: 005/ ATD PRESS: 4183

Card 2/2

BIRGER, I.A.

A general case of the deformation of shells of revolution.
Proch. i din. av. dvig. no.2:3-35 '65. (MIRA 18:12)

BIRGER, I.A., red.; DAREVSKIY, V.M.; KINASOSHVILI, R.S.; SERENSEN, S.V., red.; SHORR, B.F., red.; RODZEVICH, S.S., red.

[Stability and dynamics of aircraft engines] Prochnost' i dinamika aviatsionnykh dvigatelei; sbornik statei. Moskva, Mashinostroenie. No.1. 1964. 287 p. (MIRA 18:10)

BUKIN, Mikhail Andreyevich; BIRGER, Izrail' Semenovich; MEDVEDEV, S.R., zasl. deyatel' nauki i tekhniki RSFSR, Laureat Gosudarstvennoy premii, prof., red.; BAKUN, A., red.; CHEPELEVA, O., tekhn. red.

[Largest in the world; history of the construction of the Volga Hydroelectric Power Station (22d Congress of the CPSU)] Krupneishaia v Mire; k istorii sozdaniia Volzhskoi GES imeni XXII s"ezda KPSS. Moskva, Sotsekgiz, 1962. 225 p. (MIRA 16:4)
(Volga Hydroelectric Power Station (22d Concress of the CPSU))--
Design and construction)

BIRGER, L.A.

Effect of reflections on the power-output base calibration of standard-signal oscillators used for superhigh frequency bands. Izm.tekh. no.5:40-43 S-O '56. (MLRA 10:2)
(Oscillators, Electron-tube) (Calibration)

BIRGER, L.A.

Evaluating the nonlinearity of diode mixers. Izm. tekh. no.6:77-80 N-D '57. (MIRA 10:12)

(Electronic instruments)

05144

S/115/60/000/011/011/013
B019/B058

9.1300 (2703, 3803, 1006)

AUTHOR: Birger, L. A.

TITLE: Nonlinearity of a Cutoff Attenuator Caused Through Load Reactance

PERIODICAL: Izmeritel'naya tekhnika, 1960, No. 11, pp. 49 - 51

TEXT: In the introduction it is stated that the load reactance has a great influence on the nonlinearity of the attenuation of a cutoff attenuator. The calculations mentioned here are based on an equivalent circuit, representing a series connection of the voltage source and the impedances of the attenuator. A formula is derived for the nonlinearity of the attenuator:

$$\Delta = 4.34\left(\frac{1}{1 + x^2}\, e^{-0.1A_0} + \frac{2x}{\sqrt{1 + x^2}}\, 10^{-0.05A_0}\right) \qquad (14)$$

where $x = \frac{X/X_0}{|X/X_0|} \cdot \frac{|X|}{R}$. From this formula it can be seen that the

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Nonlinearity of a Cutoff Attenuator Caused Through Load Reactance

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information on the exact parameter values is immaterial for calculating the nonlinearity. On the contrary, the initial attenuation A_o, experimentally determined, enters the formula. Furthermore, the nonlinearity greatly depends on the ratio of the reactive and active load component. Wide-band cutoff attenuators possess a great reactive load component and the field strength decreases proportionally to the increase of initial attenuation. The nonlinearity of attenuators operating with fixed frequency may be reduced by resonance tuning of the electrode circuits. There are 3 figures and 2 Soviet references.

Card 2/2

S/194/61/000/006/065/077
D201/D302

AUTHOR: Birger, L.A.

TITLE: Errors in the superheterodyne method of attenuation measurements

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1961, 19, abstract 6 I109 (Tr. in-tov Kom-ta standartov, mer i izmerit. priborov pri Sov. Min. SSSR, 1960, no. 44 (104), 10-27)

TEXT: The block diagram of a superheterodyne measuring amplifier is given, the main sources of errors shown and formulae derived for their evaluation. The formulae which determine the overall errors, make possible the choice of rational methods of measurements; e.g. when measuring small attenuations (up to 30-50 db), the power applied to the attenuator should be such as to produce a maximum signal at the mixer output of about 1-5 microwatts. When measuring large attenuations the power of the signal should be increased to

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Errors in the superheterodyne... S/194/61/000/006/065/077 D201/D302

decrease the effect of thermal noise. As an example, the evaluation of measurement errors is given for attenuations of about 30 and 80 db. The experimental data confirm the given estimate of overall errors. [Abstracter's note: Complete translation]

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S/194/61/000/010/062/082
D271/D301

6,4311

AUTHOR: Birger, L.A.

TITLE: Determination of the effective temperature of noise radiation of non-uniformly heated loads

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 10, 1961, 12, abstract 10 I85 (Tr. In-tov Kom-ta standartov, mer i izmerit. priborov pri Sov. Min. SSSR, 1960, no. 48 (108), 42-47)

TEXT: Calibration of noise generators is performed by comparing spectral densities of noise radiation of the calibrated and standard generator. A comparison amplifier is used for this purpose. Its input inevitably generates some noise radiation; switching from one noise generator to the other causes a change of the circuit impedance connected to the amplifier input, the level of amplifier noise is changed an in consequence an error occurs in measuring the ratio of spectral densities. Reflections can also cause

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errors similar to those occurring in the measurements of monochromatic signals. A method is presented for calculating calibration errors of noise generators caused by reflections in a real measuring system. The block diagram of the comparator and calibration procedure, for which it is used are described, and a formula is derived which makes it possible to calculate errors in given conditions of measurement or else to determine permissible values of the reflection coefficient corresponding to a given accuracy of measurement. The numerical example which is given shows that even when an amplifier with a very low noise input is used and the noise sources are very accurately matched for equal values of full output impedances, the calibration error is still fairly substantial; impedance matching mentioned above can be only obtained by the use of brdige circuits. 2 figures. 4 references. [Abstracter's note: Complete translation]

VC

31839
S/194/61/000/010/060/082
D271/D301

6.4311
6.9450

AUTHOR: Birger, L.A.

TITLE: Calibration error of noise generators due to reflections

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 10, 1961, 9, abstract 10 I62 (Tr. In-tov Kom-ta standartov, mer i izmerit. priborov pri Sov. Min. SSSR, 1960, no. 48 (108), 48-53)

TEXT: Standard noise sources are used for calibrating gas discharge and diode noise generators in the microwave range; these sources are matched loads heated to a comparatively high temperature ("black body", thermal noise generator). Because of the large dimensions of this type of load, in practice it is not possible to achieve the necessary uniformity of temperature when ovens of technically acceptable dimensions are used. The problem, therefore, arises of computing the effective temperature of noise radiation X

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Calibration error...

of a non-uniformly heated load and of calculating losses of the thermally insulating sector of waveguide. The method of solving this problem is considered; it is based on Nyquist's theorem for four-terminal networks. A formula is derived, according to which noise in the load of the line composed of quadripoles connected in cascade is the sum of noise entering the input of the line attenuated by the total propagation factor of the line, and of noises contributed by individual quadripoles. The contribution of a given quadripole is determined by its temperature and insertion losses, and by the attenuation of the line between the quadripole and the load. It is proposed applying the above formula also to a non-uniformly heated lossy waveguide line: for this purpose the line is imagined divided into elementary sections by cross-sections perpendicular to its axis and spaced by a small distance dx; the entire waveguide is now considered as a cascade connection of quadripoles each with a temperature of $T(x)$ and power transfer coefficient $\exp[-2\gamma(x)dx] \approx 1 - 2\gamma(x)dx$ where $\gamma(x)$ is the attenuation per unit length. An example of computation is given, in which numerical

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D271/D301

Calibration error...

data correspond to a standard source for a 5 cm band which had been developed. 3 figures. 3 references. [Abstracter's note: Complete translation]

X

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83912

9.2585 also 2101 2201 2301 3001

S/108/60/015/010/005/008
B012/B060

AUTHOR: Birger, L. A., Active Member of the Society

TITLE: Analysis of the Stability of Circuits 25 With Automatic Phase Control of the Klystron Frequency 25

PERIODICAL: Radiotekhnika, 1960, Vol. 15, No. 10, pp. 41-47

TEXT: In systems serving for the automatic phase control of the klystron frequency, a feedback designated here as "amplitude" feedback may appear in addition to the normal "phase" feedback. Experiments showed that this "amplitude" feedback is often the cause of the circuit instability. This parasitic feedback is investigated here. The principal block diagrams relating to an automatic phase control of the klystron frequency are shown in a Fig. (Refs. 1,2) and described. Condition (2) is written down for the stability of a system serving for the frequency automatic phase control, and formula (10) is derived. The first term at the right side of this formula denotes the normal functioning of the system. The second term denotes the parasitic amplitude feedback. The characteristic in this term is the absence of multiplier ξ (ratio of the reference signal amplitude to

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Analysis of the Stability of Circuits With Automatic Phase Control of the Klystron Frequency

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the klystron signal amplitude). This is indicative of the fact that there can be an amplitude feedback and hence the possibility of a self-excitation also in the case of a switched-off reference signal. Condition (12) is then derived for stability, which determines the admissible asymmetry in the balanced mixer for the signal from the klystron at a given intensity of the reference signal and at a given holding band (polosa uderzhaniya). The fact is pointed out that the present work does not consider stability in the simultaneous action of phase and amplitude feedback. Formula (12) was derived for the block diagram of Fig. a). Formulas (18) and (19) were derived in the same way for the block diagram of Fig. b). The following conclusions were reached: (1) The stability of a circuit constructed according to Fig. a) and involving the use of a reference signal of low intensity ($\xi_0 \ll 1$) can be ensured only by rendering the balanced high-frequency mixer very carefully symmetrical (see formula (12)). This fact is a major drawback of the circuit. ξ_0 is the ratio of reference voltage to superhigh voltage. (2) For stabilizing the circuit for the automatic phase control with a frequency conversion (Fig. b)), a sufficient suppression of the intermediate frequency signals in the low-frequency filter

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Analysis of the Stability of Circuits With Automatic Phase Control of the Klystron Frequency

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must be ensured (see formula (17)). If the reference signal is large enough, the phase detector need not be exactly symmetrical. Experiments showed that the circuit stability can be ensured also when making use of an unbalanced detector. There are 1 figure and 2 references: 1 Soviet.

SUBMITTED: April 9, 1959

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6.4800
6.4310
6.9416
6.4311

20527

S/115/61/000/001/005/007
B128/B201

AUTHORS: Birger, L. A., Shvetsov, P. N., Sokov, I. A.

TITLE: Standard devices for the calibration of noise generators in the super-high frequency range

PERIODICAL: Izmeritel'naya tekhnika, no. 1, 1961, 37-40

TEXT: The authors describe a device for testing noise generators in the frequency range of from 1000-10,000 megacycles. A modulation method is employed for amplifying the weak signal. The block diagram of the device is shown in Fig. 1: 1) is the noise generator to be tested; 2) matching transformer; 3) standard noise generator; 4) device for keeping the temperatures constant; 5) tuned load (to room temperature); 7), 8), 9) waveguide connecting links; 10) signal generator; 11) waveguide branching; 12) matching transformer; 13) tuned load; 14) high-frequency modulator; 15) ferrite rectifier for eliminating parasitic noise; 16) high-frequency amplifier; 17) waveguide connecting link; 18) image frequency filter; 19) mixer; 20) heterodyne; 21) i.f. amplifier; 22) amplitude modulator; 23) amplifier for frequency-modulated signal; 24) phase modulator; 25) indicating instrument; 26) video

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Standard devices for ... S/115/61/000/001/005/007
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amplifier; 27) cathode-ray oscilloscope; 28) calibration line; 29) i.f. noise source (for compensating the i.f. noise); 30) electron modulator; 31) temperature pick-up for keeping the temperature of the standard generator constant; 32) stabilized (400 cycles) power supply unit. The noise source was tested by a comparison of the radiation temperature of the source with that of the standard generator. The measurements were made as follows: 1) tuning of the parts mentioned in 1, 2, and 5 according to amplitude and phase by means of matching transformers; 2) determination of the room temperature (T_z) by means of load (5); the room temperature usually differs from the normal temperature ($T_o = 293^oK$); 3) the standard noise generator with an effective radiation temperature is connected to the input; 4) compensation of i.f. noise by means of i.f. noise generator and connected calibration line; 5) determination of the attenuation factor

$A = 10 \lg\frac{T_{RG} - T_z}{T_o - T_z}$ [db], where T_{RG} is the effective radiation temperature of the noise source to be tested. The final evaluation of the noise generator is made on the basis of equation

$$A_{RG} = A + A_e + 4.34\cdot\left(\frac{T_z - T_o}{T_{RG} - T_o}\right) \text{ [db]}$$

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Standard devices for ... S/115/61/000/001/005/007
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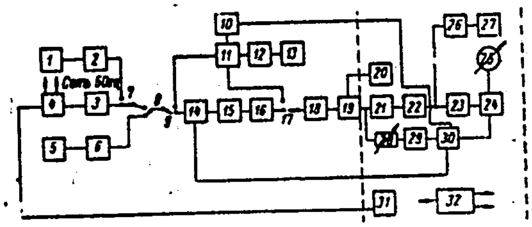
In this equation, the last summand which is to be multiplied by the temperature-dependent parameter k, is to be neglected unless the noise source to be tested is a radiator with very low temperatures. Expression A_e is obtained from

$$A_e = 10 \lg \frac{T_e - T_z}{T_o}.$$

The error in measurement caused by the standard noise generator (± 0.08 db) and the measuring method (± 0.14 db) can be reduced by repeated measurements. After the fifth measurement, it is smaller than ± 0.2 db. The authors also describe the design of the standard generator in waveguide (2600-10,000 megacycles) or coaxial construction (1000-2600 megacycles).

Fig. 1



Card 3/3

30297

S/109/61/006/011/012/021
D201/D304

9,4330

AUTHOR: Birger, L. A.

TITLE: Bandwidth and noise factor of a tunnel diode resonance amplifier

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 11, 1961, 1894 - 1899

TEXT: The approximate formulae for the bandwidth $2\Delta f$ and for the noise factor F of tunnel diode resonance amplifiers given in literature, although correctly describing their fundamental properties, do not give an accurate enough assessment on the range of their applicability and are not adequate enough from the view point of a detailed design. The present article gives the results of calculations of more exact expressions for the basic resonant amplifier properties. The calculation was carried out using the generally accepted equivalent cct of a tunnel diode. Thus R_d - negative resistance in the diode; C_d - p-n junction capacitance; L_d lead in-

Card 1/7

ductance; the generator I_1 represents the shot noise in p-n junction; I_2 - thermal noise in r_d. The bandwidth is evaluated by calculating the gain from the equivalent cct of resonance amplifier as given in Fig. 3. In this figure the tunnel diode parameters are those of a parallel transformation of the normal diode equivalent cct; g_L load conductance; g_g - conductance of the signal source I_g; jb_L - reactive conductance of the resonant circuit connected to the diode such that at resonance

$$b_{deg} + b_L = 0 \text{ if } \omega = \omega_0$$

g_r - are the losses in the resonant cct. It may be defined by the ratio η of the "loaded" to "unloaded" Q of the resonant circuit

$$\eta = \frac{g_r}{g_g + g_L + g_r}.$$

Under these assumptions the gain defined as the ratio of the square root of power P_L to the maximum power of the source $P_s = I_s^2/4g_g$, is given by

$$K_0 = \frac{2\sqrt{g_g g_L}}{g_g + g_L g_r + g_{deg}} = \frac{2\sqrt{s}}{\frac{1+s}{1-\eta} - \frac{1}{R_d g_g}\frac{u(\theta)}{w(\theta)}} \qquad (21)$$

where

$$s = \frac{g_L}{g_g} \qquad (22)$$

4

and $u(\theta)$ is given by

$$u(\theta) = 1 - \xi - \xi\theta^2; \qquad (7)$$

$w(\theta)$ by

$$w(\theta) = \theta^2\left(\left(\xi - \frac{1}{\theta_d^2}\right)^2 + \left(1 - \xi - \frac{\theta^2}{\theta_d^2}\right)\right); \qquad (9)$$

in which $\theta = \omega\tau_d = \omega R_d C_d$; $\xi = \frac{r_d}{R_d}$; $\theta_d = \omega_d \tau_d$; $\omega_d = \frac{1}{\sqrt{L_d C_d}}$. By expressing the loaded Q in terms of actual conductances and of resonant frequency, the bandwidth is derived as the exact

$$2\Delta f = \frac{1-\xi}{2\pi\tau_{d} K_0}\,\frac{2}{\sqrt{s}+\sqrt{1/s}}\,\frac{2}{1+p}\,\frac{1}{\dfrac{1}{1-\eta}-\dfrac{2}{K_0(\sqrt{s}+\sqrt{1/s})}}\,\Pi(\theta), \tag{25}$$

where

$$\Pi(\theta) = \frac{1-\left(\dfrac{\theta}{\theta_{lim}}\right)^2}{v(\theta)\left[1-\dfrac{2}{1+p}\psi(\theta)\right]}; \tag{26}$$

$$\psi(\theta) = \frac{\theta w'(\theta)}{2w(\theta)} - \frac{\theta v'(\theta)}{2v(\theta)} = \frac{\dfrac{\theta^2}{\theta^2_{xd}}}{1-\dfrac{1}{\theta^2_{xd}}-\dfrac{\theta^2}{\theta^2_{xd}}} + \frac{\theta^2\left(\xi-\dfrac{1}{\theta^2_{xd}}\right)^2 - 2\dfrac{\theta^2}{\theta^2_{xd}}\left(1-\xi-\dfrac{\theta^2}{\theta^2_{xd}}\right)}{\theta^2\left(\xi-\dfrac{1}{\theta^2_{xd}}\right)^2+\left(1-\xi-\dfrac{\theta^2}{\theta^2_{xd}}\right)^2}, \tag{27}$$

and

$$p = \frac{\omega_0 b'_L(\omega_0)}{b_L(\omega_0)}. \tag{28}$$

where $\theta_{lim} = \sqrt{1-\xi}/\xi$, $v(\theta)$ is given by

$$v(\theta) = 1 - \frac{1}{\theta_d^2} - \frac{\theta^2}{\theta_d^2}\,. \tag{8}$$

In practice this equation may be reduced to that of

$$2\Delta f = \frac{1}{2\pi\tau_d K_o}\,\frac{2(1-\eta)}{(\sqrt{s}+\sqrt{1/s})}\,\frac{2}{1+p}\left[1-\left(\frac{\theta}{\theta_{lim}}\right)^2\right] \tag{36}$$

which for $p = s = 1$, $\eta = 0$, $(\theta/\theta_{lim})^2 \ll 1$ reduces to the well known formula

$$2\Delta f = \frac{1}{2\pi\tau_d K_o}\,. \tag{37}$$

It is also easy to derive from Fig. 3 the exact formulae for evaluating the noise factor F:

$$F = 1 + \frac{T}{T_g}\frac{\eta}{1-\eta}(1+s) + \frac{T_L}{T_g}s + \frac{1+s}{1-\xi}\left[\frac{1}{1-\eta} - \frac{2}{K_0(\sqrt{s}+\sqrt{1/s})}\right]\frac{1}{1-\left(\frac{\theta}{\theta_{lim}}\right)^2}\left[\frac{eI_0}{2kT_g} + \xi(1+\theta^2)\right]. \tag{38}$$

Card 5/7

It may be seen that the noise factor is independent of the self-resonant frequency of the diode θ_d. Putting $K_0 \gg 1$ and $T = T_L = T_g = T_0 = 293^\circ K$

$$t_N = F - 1 = \frac{\eta + s}{1 - \eta} + \frac{1 + s}{(1 - \eta)(1 - \xi)} \frac{1}{1 - \left(\frac{\theta}{\theta_{lim}}\right)^2} [0{,}02 I_0 R_D + \xi (1 + \theta)^2], \qquad (39)$$

4

is obtained giving the formulae for the relative temperature t_N of the amplifier noise, where I_0 in milliamps and R_d in ohms. It may be seen that when approaching the cut-off frequency the relative noise temperature increases to infinity. Thus losses ξ and η in the diode and in the circuit and the coupling to the load must be made as small as possible (s must be reduced). This again leads to a narrower bandwidth so that a compromise must be made in the design between the bandwidth and noise temperature. The author acknowledges the constructive criticism of V.B. Shteynshleyger. There are 3 figures and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows:

20072

9.3273 (also 2503)

S/108/61/016/003/004/006
B116/B205

AUTHOR: Birger, L. A., Member of the Scientific and Technical Society for Radio Engineering and Electrocommunication

TITLE: Stability of the circuit for the automatic control of the klystron frequency

PERIODICAL: Radiotekhnika, v. 16, no. 3, 1961, 40-46

TEXT: The author discusses circuits with a large number of inertial links which is characteristic of automatic phase control of klystron oscillators. He establishes the conditions for the stability of these circuits for klystrons with frequency modulation and a large number of inertial links in the feedback circuit. The inertial links formed by amplifier stages are replaced by an ideal delay line. On this basis the limiting formulas are derived. It is demonstrated that the connection of an integrating correcting circuit permits a considerable extension of the hold-in range. One of the characteristic features of automatic phase control circuits is the hold-in range ΔF_y which is understood to be the maximum frequency

X

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20072

S/108/61/016/003/004/006
B116/B205

Stability of the circuit for the...

and the conditions

$$2\pi\Delta F_y \frac{|a(i\omega_0)|}{\omega_0} < 1, \qquad (25)$$

/равнения,

$$\omega_0\tau - \operatorname{arc\,tg}\frac{\operatorname{Im}[a(i\omega_0)]}{\operatorname{Re}[a(i\omega_0)]} = \frac{\pi}{2}. \qquad (26)$$

for the frequency of an open system. ω_0 is the root of Eq. (22), $A(\omega)$ the amplitude, $\Phi(\omega)$ the phase. With $n \geqslant 3$, the calculations of the stable range from the exact and fr. the limiting formula differ by 10 % at most. It is expedient to use th' limiting formulas for calculating the actual circuits with limited numbe: . inertial links. The author then studies a circuit without correcti.. link. Using (25) and (26) the following formulas are obtained

$$\omega\tau = \pi/2 \qquad (27)$$

$$\Delta F_y' < 1/4\tau \qquad (28)$$

i.e., with a circuit without correction links no large hold-in ranges can be obtained. By using an integrating correcting circuit (Ref. 5: R. Ley. Annales de radioelectricite. XIII. No. 33, 1958) the stable hold-in range

Card 3/4

31212

S/108/61/016/012/006/009
D201/D302

9.4220 (1052,1331)

AUTHOR: Birger, L.A., Member of the Society (See Association)

TITLE: Frequency modulation of a phase-self-locking klystron

PERIODICAL: Radiotekhnika, v. 16, no. 12, 1961, 44-48

TEXT: In the present article the author gives the design of an FM Klystron generator from the point of view of its frequency characteristic, by considering the circuit of a phase-self-locking klystron consisting of 4 main units: A phase detector PD, connected by means of a certain connecting circuit C to the reflector of the klystron generator KG, with a delay line, being actually represented by the IF amplifier producing a delay τ ', connected between the klystron output and the PD input. In real circuits the connecting circuit consists of a LP filter, d.c. amplifier and a correcting network. When considering small frequency deviations only, for which the differential equations of transients may be linearized, the operator equations are formed for each of the above units, resulting in Eq. (10)

4

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is obtained, where $\Phi(i\Omega)$ and $\Phi_{MO}(i\Omega)$ are the modulation indices of the output and MO signal respectively which correspond to the modulation frequency Ω. The ratio of moduli of modulation indices may be represented as Eq.(14)

$$|\Lambda(i\Omega)| = \left|\frac{\Phi(i\Omega)}{\Phi_{MO}(i\Omega)}\right| = 2\pi\Delta F_y \frac{|f(i\Omega)|}{|1+2\pi\Delta F_y f(i\Omega)|}$$

which gives for the phase shift $\psi(i\Omega)$, resulting from FM signal, Eq.(15)

$$\psi(i\Omega) = \operatorname{arc\,tg}\frac{I_m[\Lambda(i\Omega)]}{Re[\Lambda(i\Omega)]}$$

. A figure shows the results of numerical evaluation of Eq. (26a) for a system in which, in order to widen the stable range of oscillations, an RC correcting network is used. The relative time constant of the network is $t_k = 100$, with $\theta_{y.max}=0.25$. The shape of Eq. (26a) characteristic depends on the ratio of Ξ of the locking range, as realized in the system, to its maximum allowable value. It may be seen that the frequency characteristic of a phase-self-locking system in FM operation depends little on the time constant t_k of the 4

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33135

S/115/62/000/001/007/007
E192/E382

6.4311

AUTHORS: Birger, L.A. abd Sokov, I.A.

TITLE: Standard thermal noise-generators

PERIODICAL: Izmeritel'naya tekhnika, no. 1, 1962, 47 - 50

TEXT: Some improved thermal noise-generators for a wave range of 3.0 to 11.5 cm are described. The construction of the generators is illustrated in Fig. 1. A waveguide 3 with an attenuator 4 is placed inside a cylindrical oven 1, provided with suitable heaters 2. The attenuator forms a matched load. When the attenuator is heated it produces noise radiation. Provided that the temperature of the attenuator is uniform and that there are no losses between it and the output flange of the waveguide, the nominal spectral density of the radiated noise is equal to kT_n, where k is the Boltzmann constant and T_n is the attenuator temperature in ^{o}K. The thermocouple 5 (see Fig.1) is employed for measuring the temperature of the attenuator. The wave band of 3.0 to 11.5 cm is covered by 4 separate generators based on standard waveguides of 23 x 10,

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33135
S/115/62/000/001/007/007
E192/E382

Standard thermal noise-generators

temperature and the losses in the waveguide between the attenuator and output flange. The temperature, measurement and stabilization errors are due to errors of the control system of the heater and errors of the thermocouple. These errors are of the order of ± 5 and ± 3 °K, respectively. Errors caused by the nonuniform temperature distribution in the attenuator are 3 - 5 °K and errors caused by losses in the waveguide are 1 - 4 °K. The overall error is therefore not greater than ± 8 °K, which is equivalent to ± 0.06 db. There are 2 figures, 1 table and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The English-language references reads as follows: Ref. 3: H. Sutcliffe - Proc.Inst.Electr.Eng., Part B, 1956, v.103, no. 11.

Card 3/3

SOKHINA, A.M.; BIRGER, M.O.

Consumption of amino acids by various pathogenic microbes. Zhur. mikrobiol., epid. i immun. 42 no.3:48-52 Mr '65. (MIRA 18:6)

1. Moskovskiy institut epidemiologii i mikrobiologii.

KHAZENSON, L.B.; BIRGER, M.O.

Using filter paper discs for determining the sensitiveness of dysenteric pathogens to antibiotics. Lab.delo 2 no.3:23-25 My-Je '56. (MLRA 9:10)
(BACTERIA, PATHOGENIC) (ANTIBIOTICS)

BIRGER, M.O.

Decarboxylases of dysentery microorganisms. Zhur. mikrobiol. epid. i immun. 31 no. 10:13-17 O '60. (MIRA 13:12)

1. Iz Moskovskogo instituta epidemiologii, mikrobiologii i gigiyeny.

(SHIGELLA) (DECARBOXYLASE)

SOKHINA, A.M.; BIRGER, M.O.

Amino acid consumption by microbes of the family Enterobacteriaceae. Report No.1. Zhur.mikrobiol., epid. i immun. 32 no.11:82-87 N '61. (MIRA 14:11)

1. Iz Moskovskogo instituta epidemiologii, mikrobiologii i gigiyeny.
(ENTEROBACTERIACEAE) (AMINO ACID METABOLISM)

KRUSHINSKAYA, Ye.A.; BOCHKOVA, V.A.; BIRGER, M.O.

Medium from dried nutrient agar for determining the toxigenicity of diphtheria microbes. Lab. delo 10 no.3:172-175 '64. (MIRA 17:5)

1. Moskovskiy nauchno-issledovatel'skiy institut epidemiologii i mikrobiologii.

MYASNENKO, A.M.; SUMAROKOV, A.A.; BIRGER, M.O.; SHANDALOV, B.Ya.

Bacteriological laboratories in the Russian Socialist Federal Soviet Republic and the organization of their work. Zdrav. Ros. Feder. 6 no.4:8-11 Ap '62. (MIRA 15:4)

(BACTERIOLOGICAL LABORATORIES)

BIRGER, M.O.

Through the pages of the periodical "Zh--rnal mikrobiologii, epidemiologii i immunobiologii" for 1963. Lab. delo no. 8: 510-511 '64. (MIRA 17:12)

L 42943-65 EWT(1)/EWA(j)/EWA(b)-2 JK

a reaction method suggested by [illegible]

[illegible], it was established that the various [illegible]

L 42943-65

ACCESSION NR: AP5008023

APPROVED FOR RELEASE: 06/08/2000 CIA-RDP86-00513R000205320015-3"

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

A-1

Penetrating cosmic-ray showers at 3860 m. above sea-level. L. Ball, N. Birger and V. Veksler (*J. Physics U.S.S.R.*, 1946, 10, 196—199).—Proportional counters, employing triple coincidences, were used to investigate penetrating cosmic-ray showers on the Pamir plateau, 3860 m. above sea-level. The showers penetrated 12 cm. of Pb, and a shower consisting of at least 26 particles, equiv. to a particle density of 400 per sq. m., was observed. The frequency of these showers is ~0·05% of that of the hard component, whilst the frequency of penetrating showers with a particle density ≮ 26 per sq. m. is 0·3% of the frequency of the particles of the hard component. It is, however, possible that the large ionization found may be caused by nuclear explosions or separate highly ionizing particles produced in the counter walls or in the Pb by some penetrating radiation.

A. J. M.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

SA

A 53

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PENETRATING COSMIC RAY SHOWERS AT 3860 m ABOVE SEA LEVEL. Bell, L. N., Birger, N. G., and Veksler, V. I. C. R. Acad. Sci. URSS, 52 (No. 2) 113-16 (1946).- The showers were investigated by means of special proportional counters, triple coincidences being recorded. The apparatus consisted of an amplifier of triple coincidence and 3 sets of flat proportional counters. The experiments show that at 3860 m there exist considerably denser penetrating showers than those previously recorded, and the frequency of these showers is about 0.05% that of the hard component.

L. S. G.

Also: Journal Phys., 10, No 2, 1946

Lebedev Physical Institute, AS USSR

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA 11/49T86

USSR/Nuclear Physics - Cosmic Radiation Jul 48
Nuclear Physics - Cloud Chambers

"Studies of Showers Under Lead and Atmospheric Showers at Altitudes of 3,860 Meters by the Regulated Wilson Chamber Method," N. G. Birger, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 2 3/4 pp

"Dok Ak Nauk SSSR" Vol LXI, No 2 - p. 245-9

Reports observations (1) of showers under lead, and (2) of atmospheric showers. In (1) the Wilson cloud chamber was covered by sheet of lead 20 cm thick. Tabulates readings. In (2) following observations were made: (a) one Auger shower; (b) two showers of "explosive" type (c) two showers of

11/49T86

USSR/Nuclear Physics - Cosmic Radiation Jul 48
(Contd)

"local" type. Submitted 15 May 48.

11/49T86

BIRGER, N. G.

62/49T98

USSR/Nuclear Physics - Cosmic Rays Sep 49
Nuclear Physics - Cascades

"Electron-Nuclear Showers of Cosmic Rays and the Nucleocascade Process," N. G. Birger, et al, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 25 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 9
p. 826-56

Sets forth basic results of a series of works by the authors over a number of years. In these works, authors discovered and investigated electron-nuclear showers which are generated in nuclear interactions of extremely high energies (from 10^9 ev and up), and also nucleocascade

62/49T98

USSR/Nuclear Physics - Cosmic Rays (Contd) Sep 49

processes in cosmic rays. These two phenomena yield a gross explanation of the entire picture of processes occurring in cosmic rays. Submitted 23 May 49.

62/49T98

BIRGER, N.

SR/Nuclear Physics - Cosmic Radiation Apr 49
Nuclear Physics - Elementary Particles

'Special' Cosmic-Ray Showers," S. Azimov, N.
irger, A. Gorbunov, Phys Inst imeni P. N. Lebedev,
cad Sci USSR, 4 pp

'Dok Ak Nauk SSSR" Vol LXV, No 5

"Special" showers were discovered during 1945 Pamir expedition. Basic peculiarity of these showers, generated in lead, is simultaneous appearance of heavy, strongly ionizing and penetrating particles, and also electrons. Discusses strongly ionizing and penetrating particles and connection of "special showers with atmospheric showers. Gives several

39/49T97

[redacted]

USSR, Nuclear Physics (Contd) Apr 49

examples of "special" showers. Submitted by Acad D. V. Skobel'tsyn, 15 Feb 49.

39/49T97

[redacted]

BIRGER, N.

PA 156T80

USSR/Nuclear Physics - Cosmic Rays
Particles

21 Apr 49

"Investigating the Nature of Particles in 'Special' Cosmic-Ray Showers," N. Birger, L. Eydus, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 4 pp

"Dok Ak Nauk" Vol LXV, No 6

Discusses "special" showers studied, in 1948 in the Pamir range 3860 meters above sea level, with aid of Wilson cloud chamber in magnetic field. Chamber was previously described by Birger ("Dok Ak Nauk USSR" Vol LXI, 1948). Tabulates number of particles as function of pulse (MeV/c). Submitted by Acad D. V. Skobeltsyn 15 Feb 49.

156T80

CA

Nature of the penetrating particles in electron-nuclear showers. N. Birger, G. Zhdanov, V. Polvnov, and S. Slavatinskii. *Zhur. Eksptl. Teoret. Fiz.* 20, 478-9(1950).—The nature of the penetrating particles in electron-nuclear showers was detd. The penetrating particles of all of the showers (including the δ-shower) are divided into 23 pos. and 11 neg. particles. In certain cases the mass of the particles could be measured. The data indicate the predominance of protons among the penetrating particles of low energy. In several cases particles of both pos. and neg. signs appeared having masses less than that of the proton.

I. R. Leach

BIRGER, N. G.

"Generations of Mesons in Penetrating Showers of Cosmic Rays," Uspekh. Fiz. Nauk Vol 41, No 4, 1950.

Review of current articles by N. Birger, G. Zhdanov, V. Polynov, and S. Slavatinskiy, in Zhur. Eksper i Teoret Fiz No 5, 1950.

BIRGER N. G.

PA 194T84

USSR/Nuclear - Physics Sep 51
Cosmic Rays

"Electron Nuclear Showers and the Nuclear-Cascade Process," N. G. Birger, I. L. Rozental'

"Uspekh Fiz Nauk" Vol XLV, No 1, pp 104-112

This article represents Russian response to C. F. Powell's article "Mesons" (Reports Progress in Physics, Vol XIII, 1950), translation of which appears in this same periodical. Authors make up for Powell's "forgetfulness" to quote leading works by Soviet physicists, e.g., G. Zhdanov and

194T84

USSR/Nuclear - Physics (Contd) Sep 51

A. Lyubimov, "Dok Ak Nauk SSSR" Vol LV, 1947; and by many others (see bibliography, p 112).

194T84

BIRGER, N.

USSR/Nuclear Physics - Cosmic Rays 21 May 51

"Masses of Cosmic-Ray Particles," S. Azimov, N. Birger, N. Dobrotin, G. Zhdanov, Yu. Kokurin, S. Slavatinskiy, Phys Inst imeni Lebedev, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXVIII, No 3, pp 447-450

Authors' data shows that μ- and π-mesons are not predominant. Particles of mass intermediate between π-meson and proton and with lifetime over 10^{-8} sec occur at 3-4 km altitudes; they do not exceed 10% of observed protons. These results differ from those of Alikhanyan and Alikhanov. Authors were assisted by advice of Acad D. V. Skobeltsyn, V. I. Veksler,

186T98

USSR/Nuclear Physics - Cosmic Rays (Contd) 21 May 51

Corr Mem, Acad Sci USSR, Prof S. N. Vernov, Prof E. L. Feynberg, and G. T. Zatsepin. App used was built with assistance of A. G. Novikov, A. A. Malinkin, V. N. Polynov, and G. I. Sergeyev. Submitted by D. V. Skobeltsyn.

186T98

Birger, N. G.

USSR.

Nature of the penetrating particles in electron-nuclear showers. S. A. Azimov, N. G. Birger, V. N. Polvnov, and G. A. Shvatinskii. *Doklady Akad. Nauk S.S.S.R.* 85, 287-90(1952); cf. C.A. 46, 4382h.—The app. described earlier was improved and further measurements are reported. The av. no. of particles in a shower is 5. The measurements show that of the penetrating particles in electron-nuclear showers which have an impulse [illegible] 30-50% are mesons and 50-70% are protons. J. R. L.

Phys. Inst imeni Lebedev, Acad Sci USSR; Phys-Tech Inst Acad Sci Uzbek SSR.

BIRGER, N. G.

2

7

B. T. R.
Vol. 3 No. 3
Mar. 1954
Nuclear Physics
Nucleonics and
Radiation

RMT
9-13-54

3995. Particles From the Cosmos. N. G. Birger and L. Kh. Eidus. *Nauka i Zhizn*, v. 20, no. 8, Aug. 1953, p. 9-11, 13.

Presents a generalized description of π- and μ-mesons. Discusses nature of electron-nuclear showers and cascades. Photograph, diagram.

Birger, N.G.

600-RML

5

9730

INTERACTION OF COSMIC RAY PARTICLES OF 10^{10} TO 10^{11} ev WITH LIGHT NUCLEI MEASURED AT 4Km ELEVATION. N. G. Birger, V. V. Guseva, G. B. Zhdanov, S. A. Slavatinskii, and G. M. Stashkov. Izvest. Akad. Nauk S.S.S.R. Ser. Fiz. 19, 546(1955) Sept.-Oct. (In Russian)

Most of the observed showers had four or more charged particles. The mean of the angular distribution of shower particles in the center of gravity of the two colliding nucleons was symmetric and close to isotropic. Also, the spectrum of shower particle momenta formed in the light matter was obtained in the interval of 5×10^8 to 3×10^9 ev/c. (R.V.J.)

BIRGER, N.G., kandidat fiziko-matematicheskikh nauk; RAZORENOV, L.A., kandidat fiziko-matematicheskikh nauk

Mesons. Nauka i zhizn' 22 no.7:21-23 Jl '55. (MLRA 8:9)
(Mesons)

BIRGER, N. G.

C-3

Category : USSR/Nuclear Physics - Elementary Particles

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 421

Author : Birger, N.G., Guseva, V.V., Zhdanov, G.B., Slavatinskiy, S.A., Stashkov, G.M.

Inst : Phys. Inst., USSR Acad. of Sciences

Title : Certain Cases of Generation of Heavy Particles by Nuclei of Be Atoms.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 3, 590-591

Abstract : A Wilson chamber placed in a magnetic field and located at an altitude of 3860 meters above sea level recorded three showers, generated in Be, in which the formation and decay in flight of Σ^+, Λ^0, and θ^0 heavy particles. The angles φ between the plane of generation of the unstable particle and the plane of its decay are 57 ± 10^o, 74 ± 10^o, and 15 ± 5^o respectively. These results can be compared with the fact that in the case of pair generation of hyperons and K-particles by π^--mesons and H, the angle φ is in every case less than or equal to 40^o. The difference in the results obtained is apparently due to the presence of secondary processes occurring inside the Be nucleus (scattering of hyperons or creation of hyperons by secondary particles of the shower).

Card : 1/1

Distr: 4E3d

3754

AUTHOR: BIRGER,N.G., RIGOROV,N.L.G., GUSEVA,V.V., ŽDANOV,G.B. PA - 2005
SLAVATINSKIJ,S.A., STAŠKOV,G.M.

TITLE: Interaction between Particles of the Cosmic Radiation of the Energy 5.10^9-5.10^{10} eV and the Nuclei of Be-Atoms.

PERIODICAL: Zhurnal Eksperimental'noi i Teoret.Fiziki,1956, Vol 31, Nr 6, pp 971-981 (U.S.S.R.)
Received: 1 / 1957 Reviewed: 3 / 1957

ABSTRACT: This paper studies the production of mesons by particles of the cosmic radiation of more than 5.10^9 eV under conditions which resemble nucleon-nucleon collision as much as possible. For this purpose the authors arranged a WILSON chamber with a Be-plate of 9,8 g/cm^2 thickness in the magnetic field of an electro-magnet of the mean field strength 8500 Ørsted. This WILSON chamber was controlled by a system of counters. These measurements (Scientific Station PAMIR, height 3860 m) lasted a total of 950 hours and furnished about 5300 photographs. 31 photographs show electron nuclear showers with four and more particles and about 10 showers with less (2 or 3) secondary particles were observed. As the events detected by the measuring device amount to about 10% of all interaction acts between nucleons of $\geqslant 5.10^9$ eV and atomic nuclei, showers with few particles are likely to be formed in the case of many interaction acts in the case of the energies mentioned. In this case only the characteristics of those interaction acts are considered on the occasion of which at least four secondary particles are emitted. The corresponding data for these showers are

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SUBJECT USSR / PHYSICS

AUTHOR BIRGER,N.G., GUSEVA,V.V., KOTEL'NIKOV,K.A., MAKSIMENKO,V.M., RJABIKOV,S.V., SLAVATINSKIJ,S.A., STAŠKOV,G.M.

TITLE The Analysis of the Cases of the Production of Mesons by Particles of Cosmic Radiation. II.

PERIODICAL Žurn.eksp.i teor.fis,31, fasc.6, 982-986 (1956) Issued: 1 / 1957

Three such cases are described here. For the direct measuring of the energy of the particles producing electron-nucleon showers the authors in the winter of 1955-1956 added a further WILSON chamber fitted below the gap of the electromagnet to their apparatus (described by BIRGER et al., Zurn.eksp.i teor. fis, 31, 971 (1956)). The charged particle is deflected after passage through the upper chamber by the field of the electromagnet with a field strength of about 10^4 ørsted. In the lower chamber the trace of the primary particle can be followed on a beryllium plate, and from the traces of the secondary particles the point of the production of the shower in the beryllium plate is determined. From the deviation of this point from the direction of the motion of the particle before being deflected in the magnetic field it is possible to determine the momentum and the sign of the charge of the shower-producing particle. In the case under investigation p_{max}=50 BeV/c. However, by using two WILSON chambers the "light intensity" of the device was considerably diminished. Altogether, four pictures of showers with more than four charged secondary particles were taken, from which it was possible to determine

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VIL'SON, Dzh. [Wilson, J.G.], red.; BAYYER, V.N. [translator]; MAKSIMENKO, V.M. [translator]; SARYCHEVA, L.I. [translator]; BIRGER, N.G., red.; ROZENTAL', I.L., red.; NAKHIMSON, I.G., red.; KHAR'KOVSKAYA, L.M., tekhn.red.

[Physics of cosmic rays; modern achievements] Fizika kosmicheskikh luchei; sovremennye dostizheniia. Sost. gruppoi avtorov. Pod red. Dzh.Vil'sona. Moskva, Izd-vo inostr.lit-ry. Vol.3. 1958. 444 p. Translated from the English. (MIRA 13:6)
(Cosmic rays)

BIRGER, N.G.

CONCERNING A PECULIARITY IN THE INTERACTION OF PARTICLES WITH ENERGY $> 10^{11}$ ev

N. Birger, S. Slavatinskiy, Yu. Smorodin

Kinematic analysis is applied to photographs of the interaction of nucleons of energy $E_0 > 10^{11}$ ev with nuclei. From conservation laws it follows that the magnitude $\sum (E_\perp' - P_\perp') + P_\perp' (I - \cos \theta_\perp')$ is close to the mass of the target.

In most cases of the observed interactions summation over all registered particles yields a value on the left-hand side that is close to the mass of a pi-meson. If the possibility of a loss of pi-meson emerging at angles close to 90° is excluded, then the pi-meson should be considered as the target in the cases considered.

Report presented at the International Cosmic Ray Conference, Moscow, 6-11 July 1959

24(5) SOV/56-36-4-30/70

AUTHORS: Birger, N. G., Smorodin, Yu. A.

TITLE: On the Kinematics of Elementary Interactions (O kinematike elementarnykh vzaimodeystviy)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1159-1167 (USSR)

ABSTRACT: The investigation of the interaction between high-energy particles ($>10^9$ev) and nucleons and nuclei meets with difficulties caused by the following two main reasons: As no complete theoretical description of the interaction processes is available, the existing experimental material cannot be analyzed according to uniform points of view; the experimental devices used today for the purpose of investigating the interaction of fast particles (cosmic radiation, accelerator) do not render a complete determination of the processes observed possible. The object of the present paper is the consideration of some kinematic methods of analyzing nuclear interactions of fast particles. This analysis furnishes individual partial process characteristics which are free from representations using the similarity method (model representations). By employing the theorems of conservation, the authors derive a

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number of interaction relations; thus, an expression is given for the number k of particles contained in a given solid angle for the case in which, in the c.m.s., the nucleons fly off isotropically. Also for k_{max} a formula is derived. The relations obtained are finally applied to experimental data. The analysis of such interactions observed in cloud chambers and photographic emulsions in the c.m.s of the colliding particles (of tables 1 and 2) supplies angular and energy characteristics of the interactions. The results obtained by these investigations are discussed in detail. The authors thank the staff members of the Laboratoriya kosmicheskikh luchey FIAN (Laboratory for Cosmic Radiation of the Physics Institute of the AS) and of the NIIYaF (Scientific Research Institute for Nuclear Physics) for discussions. There are 5 figures, 2 tables, and 13 references, 7 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

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AUTHORS: Birger, N.G., Slavatinskiy, S.A., Smorodin, Yu.A.

TITLE: On one peculiarity of interaction of particles with average energy of 200 Bev

PERIODICAL: Referativnyy zhurnal. Fizika, no. 10, 1961, 96, abstract 10B502 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 1", Moscow, AN SSSR, 1960, 154 - 156)

TEXT: Kinematical method of analysis is applied to investigations of interactions of particles with average energy of 200 Bev. The method makes it possible to determine effective mass of the target nucleus.

[Abstracter's note: Complete translation]

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BIRGER, N. G., SMORODIN, YU. A.,

"On the Interactions of Mesons and Nucleons."

report submitted for the Intl. Conf. on Cosmic Rays and Earth Storm (IUPAP) Kyoto, Japan 4-15 Sept. 1961.

BIRGER, N.G.; WANG KANG-CH'ANG; WANG TS'U-TSÊNG; TING TA-TS'AO; KATYSHEV, Iu.V.; KLADNITSKAYA, Ye.N.; KOPYLOVA, D.K.; LYUBIMOV, V.B.; NGUEN DIN TY; NIKITIN, A.V.; PODGORETSKIY, M.I.; SOLOV'YEV, M.I.

[Inelastic interaction of 6.8 Bev/s π^--mesons and nucleons] Neuprugie vzaimodeistviia π^--mezonov s impul'som 6,8 Bev/s s neuklonami . Dubna, Ob"edinennyi in-t iadernykh issl., 1961. 30 p. (MIRA 14:11)

(Mesons) (Nucleons)

BIRGER, N.G.; VAN GAN-CHAN [Wang Kang-ch'ang]; VAN TSU-TSZEN [Wang TS'u-tsêng]; DIN DA-TSAO [Ting Ta-ts'ao]; KATYSHEV, Yu.V.; KLADNITSKAYA, Ye.N.; KOPYLOVA, D.K.; LYUBIMOV, V.B.; NGUYEN DIN TY; NIKITIN, A.V.; PODGORETSKIY, M.I.; SMORODIN, Yu.A.; SOLOV'YEV, M.I.; TRKA, Z.

Inelastic interactions of 6.8 Bev./c π^--mesons with nucleons. Zhur. eksp. i teor. fiz. 41 no.5:1461-1474 N '61. (MIRA 14:12)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Collisions (Nuclear physics))
(Mesons) (Nucleons)

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AUTHORS: Bayukov, Yu. D., Birger, N. G., Leksin, G. A., Suchkov, D. A.

TITLE: The nature of elastic πN and pp scattering in the region of large transferred momenta

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 1(7), 1962, 339-341

TEXT: The results of experimental and theoretical papers concerning elastic πN and pp-scattering with transferred momenta >0.5 Bev/c are reviewed, discussing mainly the energy course of the differential elastic scattering cross section. Investigations of the asymptotic behavior of the scattering amplitude point to a relation $d\sigma_{el}/dt = f(t)s^{2[l(t)-1]}$ where t is the square of the transferred four-momentum and s is that of the total particle energy in the c. m. s. Numerical results from several papers are used to study the |t| - dependence of l(t) at t-values of from 0.5 to 2.4 $(\mathrm{Bev/c})^2$ and s up to 52 $(\mathrm{Bev})^2$. It is found that l(t) drops

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